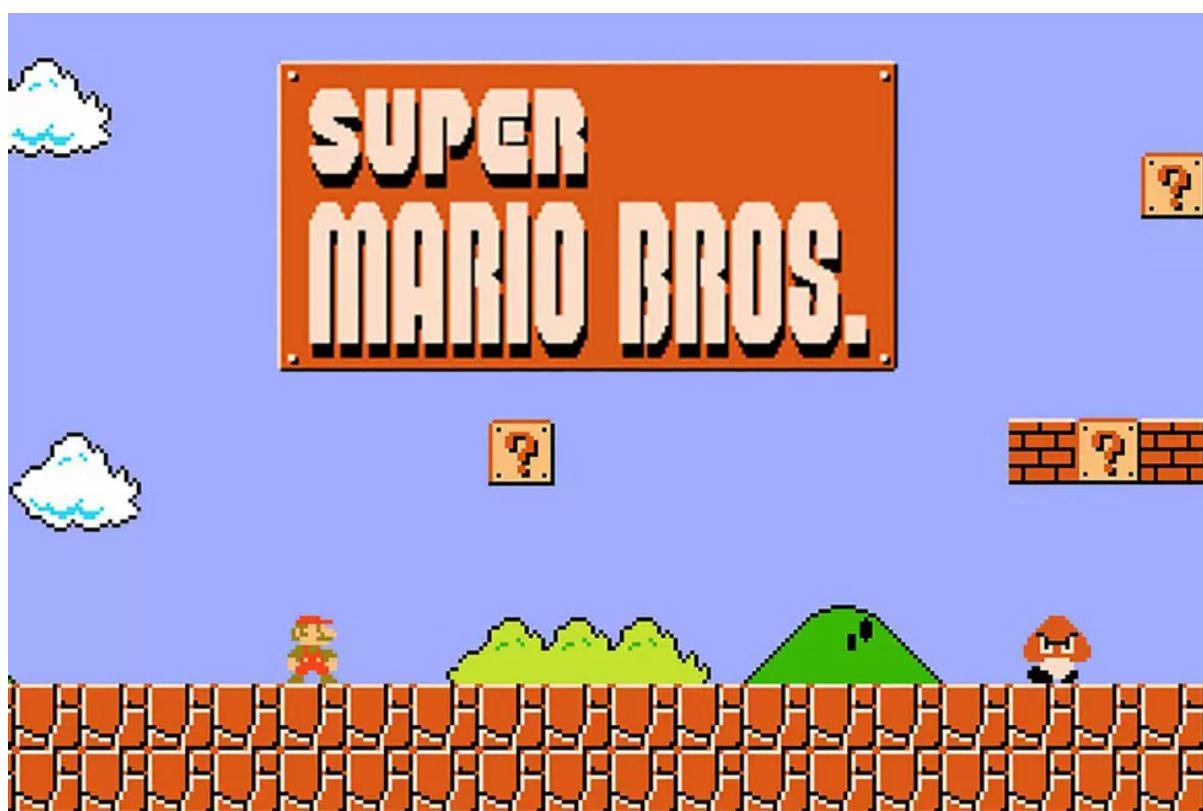


## Project : Mario Game

The programming side-project for this year is very exciting. The student has to develop a small video game, or more precisely the first level of the very famous video game Super Mario Bros. The goal of this project is to familiarize the student with fairly voluminous programming projects. In which he must deal with the writing a high number of lines of code, and at some point must be able to organize his code properly to be able to manage this subsequent program. The 2nd goal of the project is to allow the student to become familiar with video game programming. This area of programming is relatively difficult, with a notch of difficulty more than what the student is used to doing in tutorials. It is often said that video game programming touches on a very diverse panel of programming models, such as system programming, imaging, 3D synthesis, network programming, artificial intelligence, human-machine interface, mathematical optimization, audio programming, physical simulation...etc.



Super Mario Bros level-1 world-1

The programming of this video game should be done using the Raylib graphics engine. It is not really a graphics engine but rather a graphics library. This library is famous that with ease allows students and programmers the initiation steps to create simple 2D or 3D games. To learn how to use this library, the student should refer as a starting point, to the official

website of the library, and rely on its main resources. First, the Cheatsheet which contains the definition of all the functions of the library, which are not numerous by the way. And secondly, the many available examples that include all the principal features and capabilities of the library. Of course, in 3rd position comes on the same website a wiki that can also be useful. Without forgetting also the many tutorials on YouTube or on the internet.

## How the game should be programmed

The programming of this first level of the Super Mario Bros game must be a little different from the original. Level 1-1 must remain the same, moreover the map of the level is available in the image file format *world 1-1.png*, available in the compressed file of the project resources, or in the web page of the project statement. The student must imperatively use this image. There is also another image included in the compressed file of the project resources named *mario.png* and the web page. It represents what are called sprites sheet, or the succession of different images necessary for the movement of the main character Mario. These sprites are also mandatory to use in the project. Although, only a few sprites are necessary for Mario's movement, you do not need to use them all. You can see below a portion of what the spites sheet looks like.



Mario sprites sheet

The game must be programmed as a so-called platformer. Platformers are games like Mario, based on a gameplay of jumping from one platform to another. In this case, the student must program the movements of the character Mario with the ability to jump and run. The game must contain only one enemy. You are free to choose whatever you want as an enemy. It can be a monster, a dragon, or an evil sun, whatever you want. The enemy must fly follow Mario in his movement and throw projectiles at him. Here again you have a total freedom to choose any type of projectile with any trajectory for these projectiles you want. The only condition here is that the projectiles must be managed by a doubly linked list, they must be inserted into the list when they are created and released from the list when they are destroyed. So the general gameplay is quite simple. Mario must start from his usual starting point, travel the level avoiding the enemy's projectiles while jumping by the platforms and avoiding falling into holes, until he reaches the end of the level.

## Clauses and conditions

- To be accepted, the game should follows the specifications detailed above.
- This project should be done individually, in monomial number of students.

- The project is limited for a total number of ten students accepted, which means, only the first ten valid submissions will be accepted.
- The project imply only students from groupes 4, 5, and 6.
- One compressed file containing all the game files, including the executable, should be sent by email.
- The submission email address is [kara.abdelaziz@el-kalam.com](mailto:kara.abdelaziz@el-kalam.com).
- The deadline for submission is dated to the 31/12/2024 at 00:00.
- The student accomplishing this project will be rewarded with 5 bonus points in TD and TP grades.

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